

In the name of God

SCREENING STRATEGIES FOR HYPERTENSION

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Conflict of interest statement

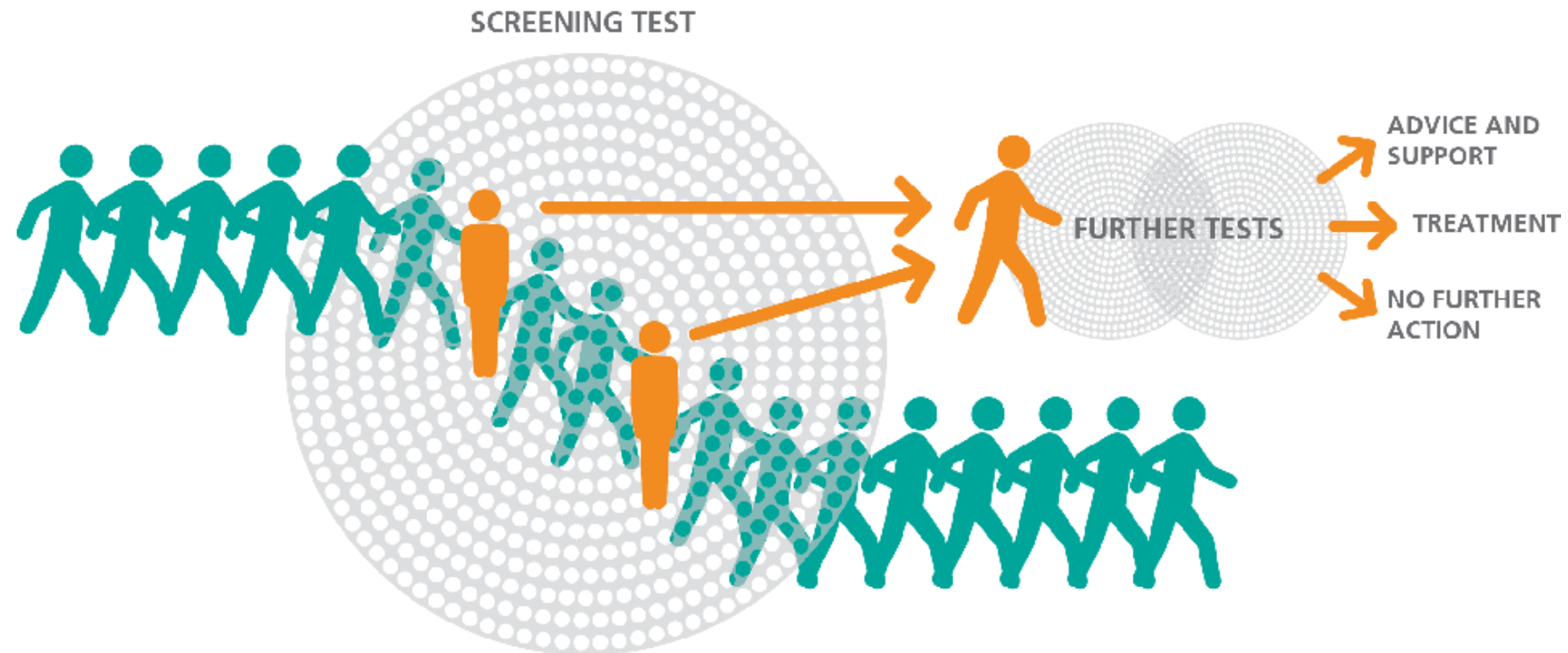
Nothing to declare

Objects

- **Introduction**
- **Types of Screening for HTN**
- **Two examples of universal screening for HTN**
 - **WHO STEPwise Approach to NCD**
 - **MMM**
- **USPSTF recommendation**
- **Global impact of BP Thresholds**
- **Take-home Message**

Introduction

- Screening is generally defined as the detection of unknown disease among apparently healthy individuals through tests or examinations conducted to identify those at increased risk for the condition.



Types of Screening for HTN

- 1. Mass screening:**
Screening apparently healthy populations regardless of the presence of risk factors (at public places, e.g. markets).



Types of Screening for HTN

2. Targeted screening: Screening specific groups of people who are considered to be at higher risk of HTN than the general population.

3. Opportunistic screening: Screening individuals engaging with the health system or in another environment in which screening may be offered (e.g. HIV clinic, corporate health day).



Two examples of universal screening for HTN

The World Health Organization STEPwise Approach to Noncommunicable Disease Risk-Factor Surveillance: Methods, Challenges, and Opportunities

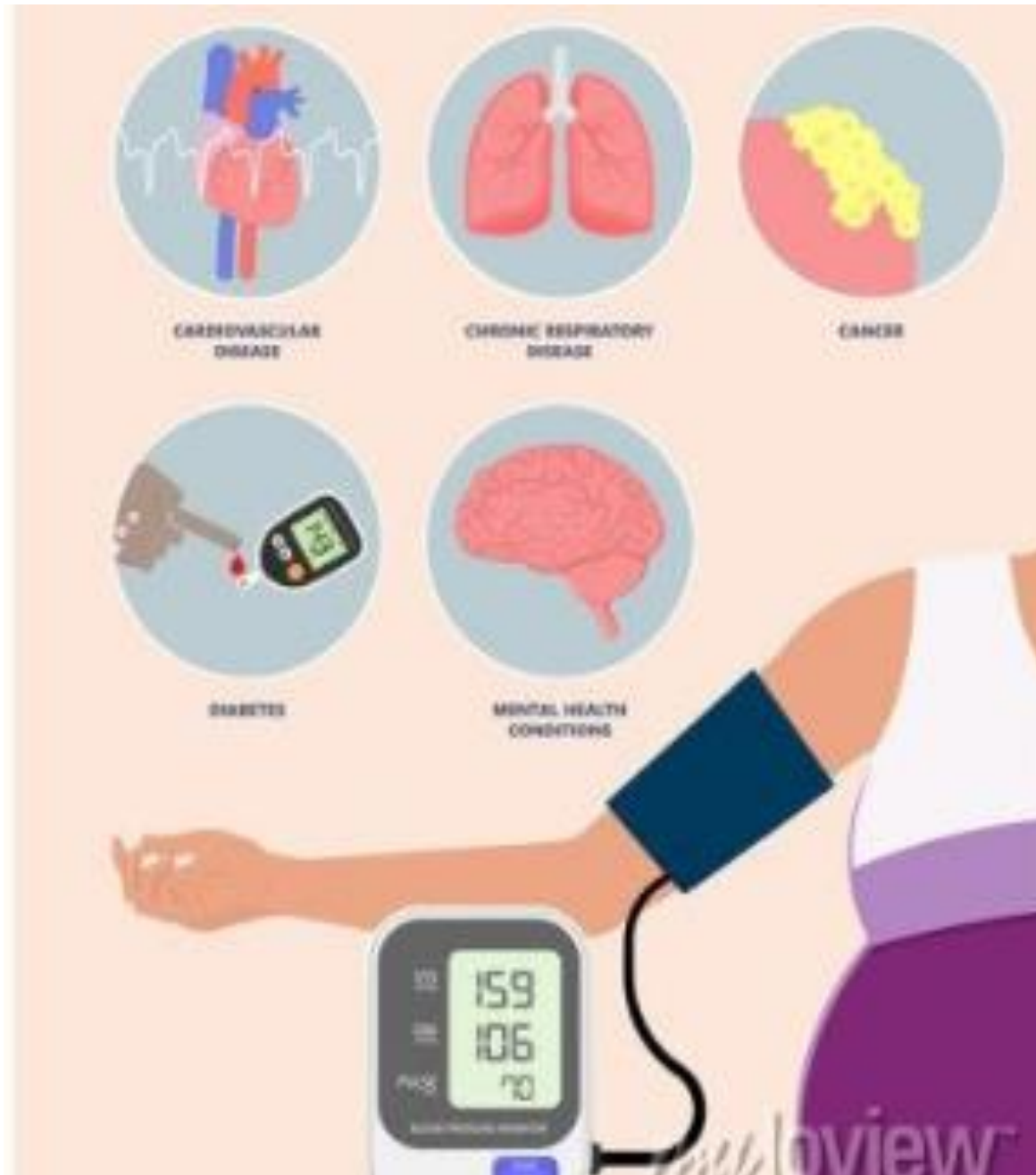
Leanne Riley, MSc, Regina Guthold, PhD, Melanie Cowan, MPH, Stefan Savin, MD, MPH, Lubna Bhatti, MD, Timothy Armstrong, PhD, and Ruth Bonita, PhD

Objectives. We sought to outline the framework and methods used by the World Health Organization (WHO) STEPwise approach to noncommunicable disease (NCD) surveillance (STEPS), describe the development and current status, and discuss strengths, limitations, and future directions of STEPS surveillance.

Methods. STEPS is a WHO-developed, standardized but flexible framework for countries to monitor the main NCD risk factors through questionnaire assessment and physical and biochemical measurements. It is coordinated by national authorities of the imple-

number of premature deaths from NCDs by one third by 2030.³

The key to controlling the global epidemic of NCDs and meeting these ambitious but achievable NCD targets is primary prevention based on comprehensive population-wide programs. Effective prevention of NCDs is



Main Types of NonCommunicable Diseases (NCDs)

The WHO STEPwise Approach to NCD Risk-Factor Surveillance

- STEPS is a WHO-developed, standardized but flexible framework for countries to monitor the main NCD risk factors through questionnaire assessment & physical & biochemical measurements.
- The STEPS surveys are generally household-based & interviewer administered, with scientifically selected samples of around 5000 participants.



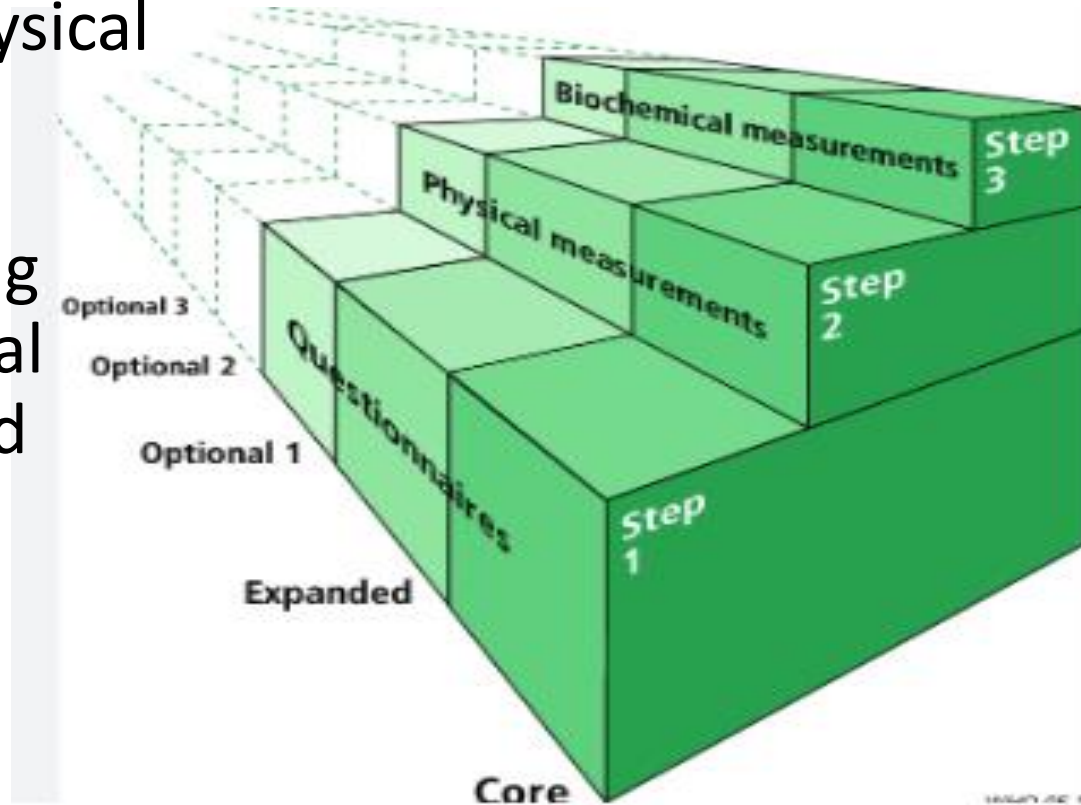
STEPwise Approach to Surveillance Sampling

- The basis of STEPS risk-factor surveillance is repeated **cross-sectional, population-based household surveys**.
- Multistage cluster sampling is used in most countries to draw a nationally representative sample of adults aged **18 to 69** years.



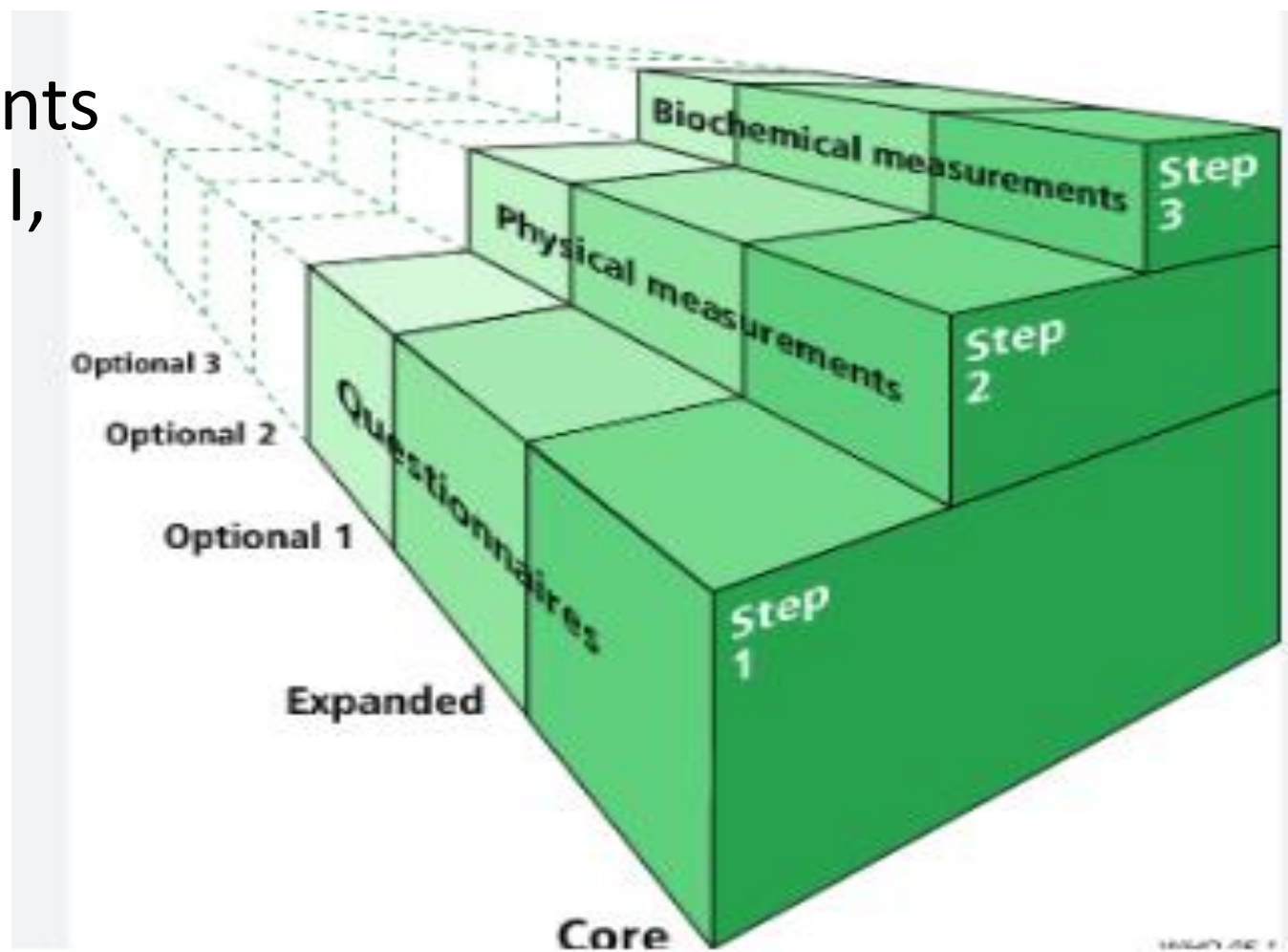
Methods

- **In step 1**, information on demographics & behavioral risk factors (tobacco use, alcohol consumption, dietary behaviors such as fruit & vegetable intake & salt & Na intake, & physical inactivity, as well as Hx of NCDs & related conditions such as raised **BP**, DM, raised cholesterol, CVD; cervical cancer screening coverage in women; & provision of general lifestyle advice to tackle NCDs) is collected through **self-report**.



Methods

- **Step 2:** Physical measurements of H & W to measure the BMI, waist circumference, & **BP**.
- **Step 3:** Biochemical measurements of FBS, total cho levels, & urinary Na.



Methods

- Within each step, countries are encouraged to focus on the “core” or most essential information on each risk factor.
- **“Expanded”** items, include:
 - **Step 1.** Additional information for the core questions on each of the behavioral risk factors.
 - **Step 2.** Measurement of hip circumference & heart rate.
 - **Step 3.** Biochemical assessment of TG & HDL levels.
- Finally, standardized “optional” modules have been developed in collaboration with the respective technical departments in WHO & topic area experts in violence & injury, mental health & suicide, oral health, sexual & reproductive health, & tobacco policy.

Status of the WHO's STEPwise Approach to NCD Surveillance Implementation in 2015



Conclusion

- STEPS data are being used to inform NCD policies & track risk-factor trends.
- Future priorities include strengthening these linkages from data to action on NCDs at the country level, & continuing to develop STEPS' capacities to enable a regular & continuous cycle of risk-factor surveillance worldwide.





وزارت بهداشت، درمان و آموزش پزشکی

موسسه ملی
تحقیقات سلامت
جمهوری اسلامی ایران



مرکز تحقیقات بیماری‌های زoonotic
و بیماری‌های عفونی
پژوهشگاه علوم و خدمات بهداشتی درمانی تهران



سازمان بهداشت

نتایج هفتمین دوره پیمایش ملی عوامل خطر بیماری‌های غیر واگیر در سال ۱۳۹۵

بر اساس چارچوب سازمان جهانی بهداشت

جدول ۱-۱. توزیع تعداد افراد شرکت کننده در مطالعه به تفکیک گام‌های مطالعه، گروه‌های سنی و جنسیت در سطح ملی

آزمایشگاه		سنجش‌های جسمانی		پرسشگری		گروه سنی
Step 3		2		1		
مرد	زن	مرد	زن	مرد	زن	
0	0	1233	1422	1261	1542	۱۸ - ۲۴
2068	2647	3335	3532	3426	3865	۲۵ - ۳۴
2109	2554	3055	3213	3137	3358	۳۵ - ۴۴
1868	2245	2577	2872	2638	2935	۴۵ - ۵۴
1541	1726	2034	2211	2100	2279	۵۵ - ۶۴
445	567	619	769	647	791	۶۵ - ۶۹
993	870	1299	1133	1357	1205	۷۰ سال و بالاتر
9024	10609	14152	15152	14566	15975	کل سنین

نتایج هفتمین دوره پیمایش ملی عوامل خطر بیماری‌های غیرواگیر در سال ۱۳۹۵

جدول ۳-۲-۱. توزیع درصد فشارخون بالا براساس فشار خون سیستولیک بالاتر از ۱۴۰ میلیمتر جیوه و فشار خون دیاستولیک بالاتر از ۹۰ میلیمتر جیوه به تفکیک گروه‌های سنی و جنسی در سطح ملی

زن	مرد	هر دو جنس	گروه سنی
درصد (فاصله اطمینان ۹۵٪)	درصد (فاصله اطمینان ۹۵٪)	درصد (فاصله اطمینان ۹۵٪)	
3.93 (2.90 - 4.96)	8.86 (6.93 - 10.79)	6.21 (5.15 - 7.27)	۱۸ - ۲۴
6.37 (5.41 - 7.32)	10.30 (9.08 - 11.52)	8.22 (7.45 - 8.99)	۲۵ - ۳۴
16.79 (15.43 - 18.15)	16.05 (14.59 - 17.5)	16.43 (15.44 - 17.42)	۳۵ - ۴۴
35.38 (33.56 - 37.2)	28.49 (26.66 - 30.31)	32.12 (30.82 - 33.41)	۴۵ - ۵۴
53.24 (51.07 - 55.41)	44.17 (41.94 - 46.41)	48.92 (47.36 - 50.49)	۵۵ - ۶۴
63.78 (60.23 - 67.33)	56.94 (52.98 - 60.90)	60.73 (58.09 - 63.38)	۶۵ - ۶۹
73.22 (70.62 - 75.82)	56.22 (53.45 - 58.99)	64.29 (62.35 - 66.24)	۷۰ سال و بالاتر
28.19 (27.44 - 28.93)	25.73 (24.96 - 26.50)	27.01 (26.48 - 27.55)	کل سنین

هفتمین دوره پیمایش ملی عوامل خطر بیماری‌های غیرواگیر در سال ۱۳۹۵

جدول ۳-۲-۲. توزیع درصد پره هیپرتنشن براساس فشار خون سیستولیک بین ۱۲۰ تا ۱۴۰ میلیمتر جیوه و فشار خون دیاستولیک بین ۸۰ تا ۹۰ میلیمتر جیوه به تفکیک گروه‌های سنی و جنسی در سطح ملی

زن	مرد	هر دو جنس	گروه سنی
درصد (فاصله اطمینان ۹۵٪)	درصد (فاصله اطمینان ۹۵٪)	درصد (فاصله اطمینان ۹۵٪)	
19.88 (17.79 - 21.98)	35.91 (33.13 - 38.69)	27.27 (25.53 - 29.01)	۱۸ - ۲۴
26.30 (24.85 - 27.74)	40.80 (39.08 - 42.51)	33.15 (32.02 - 34.27)	۲۵ - ۳۴
31.73 (30.11 - 33.36)	40.94 (39.15 - 42.74)	36.18 (34.97 - 37.39)	۳۵ - ۴۴
33.02 (31.26 - 34.77)	38.81 (36.89 - 40.73)	35.76 (34.46 - 37.06)	۴۵ - ۵۴
27.57 (25.68 - 29.47)	35.04 (32.93 - 37.15)	31.15 (29.73 - 32.57)	۵۵ - ۶۴
23.40 (20.36 - 26.43)	29.46 (25.82 - 33.10)	26.12 (23.77 - 28.46)	۶۵ - ۶۹
18.67 (16.41 - 20.93)	27.71 (25.25 - 30.17)	23.45 (21.76 - 25.14)	۷۰ سال و بالاتر
27.50 (26.78 - 28.21)	37.50 (36.68 - 38.32)	32.28 (31.74 - 32.83)	کل سنین

هفتمین دوره پیمایش ملی عوامل خطر بیماری‌های غیرواگیر در سال ۱۳۹۵

May Measurement Month

- Every year, **17 May** is dedicated to **WHD**.
- As a result of the rapidly growing burden of disease associated with the global increase in HTN, the ISH & the World HTN League (WHL) has designated the **entire month of May as MMM**.





A SIMPLE MEASURE TO SAVE LIVES

Did you know?

The No.1
contributing risk
for global death is
high blood pressure

10 Million
lives are lost
needlessly each year due
to high blood pressure

Only 1/2
of people
with high blood
pressure, know it

Have your blood pressure checked for FREE during

MAY MEASUREMENT MONTH

1 – 31 May

#checkyourpressure



@maymeasure



www.maymeasure.com

May Measurement Month is an initiative led by the International Society of Hypertension and endorsed by the World Hypertension League

MMM 2018 Poster

WORLD —
HYPERTENSION
— **DAY** *initiated by the*
World Hypertension League

Measure Your Blood Pressure, www.whleague.org
Control It, Live Longer

May 17, 2022
Save the Date!

European Heart Journal Supplements (2021) 23 (Supplement B), B1-B5
The Heart of the Matter
doi:10.1093/eurheartj/suab014



May Measurement Month 2019: results of blood pressure screening from 47 countries

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Nadia Khan⁶, Yoshihiro Kokubo⁷, Peter M. Nilsson⁸, Dorairaj Prabhakaran⁹,
Markus P. Schlaich¹⁰, Aletta E. Schutte¹¹, George S. Stergiou¹²,
Thomas Unger¹³, and Thomas Beaney^{1,14}

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²Department of Medical and Surgical Sciences, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Via Massarenti 9,

Table 1 Summary statistics for 51 countries with at least 2500 participants from May Measurement Month 2019

Country	Total participants	Proportion of all participants with hypertension	Proportion of hypertensives aware	Proportion of hypertensives on medication	Proportion of those on medication with controlled BP	Proportion of all hypertensives controlled
India	362 708	29.4%	43.8%	42.0%	55.5%	23.3%
China	238 387	27.8%	51.5%	48.4%	60.2%	29.1%
Argentina	94 523	52.5%	81.1%	77.7%	59.2%	46.0%
Philippines	89 941	53.3%	65.0%	62.8%	61.1%	38.4%
Nepal	74 205	27.5%	46.3%	37.5%	54.3%	20.3%
Colombia	48 324	27.9%	63.7%	60.0%	64.0%	38.4%
Mexico	39 700	25.5%	43.8%	41.7%	66.8%	27.8%
Kenya	33 992	26.1%	34.5%	31.5%	59.7%	18.8%
United Arab Emirates	32 152	23.9%	54.5%	49.6%	59.7%	29.6%
Cameroon	30 187	20.8%	29.9%	24.0%	46.7%	11.2%

MMM19 Summary

- The MMM19 campaign was a **cross-sectional opportunistic survey** of the BP levels of adults (aged ≥ 18 years) who volunteered to be screened.
- Screening sites were set up in a wide range of places from clinical settings such as hospitals & pharmacies to public spaces, such as supermarkets.

MMM19 Summary

- Three sitting BP readings were obtained on each screenee using standardized methods & the mean of the last 2 was used in the analyses.
- Those screenees found to have BP levels in the hypertensive range (SBP \geq 140 &/or DBP \geq 90 mmHg) were given advice on diet & lifestyle to help reduce their BP & locally tailored advice to facilitate further f/u of their raised BP.
- Prior to BP measurement, a brief questionnaire was administered collecting data on demographic, medical, social, & lifestyle variables.
- Data were collected from 1,508,130 screenees from 92 countries in 2019.

Hypertension

Volume 76, Issue 2, August 2020; Pages 333-341
<https://doi.org/10.1161/HYPERTENSIONAHA.120.14874>




EPIDEMIOLOGY/POPULATION SCIENCE

May Measurement Month 2019

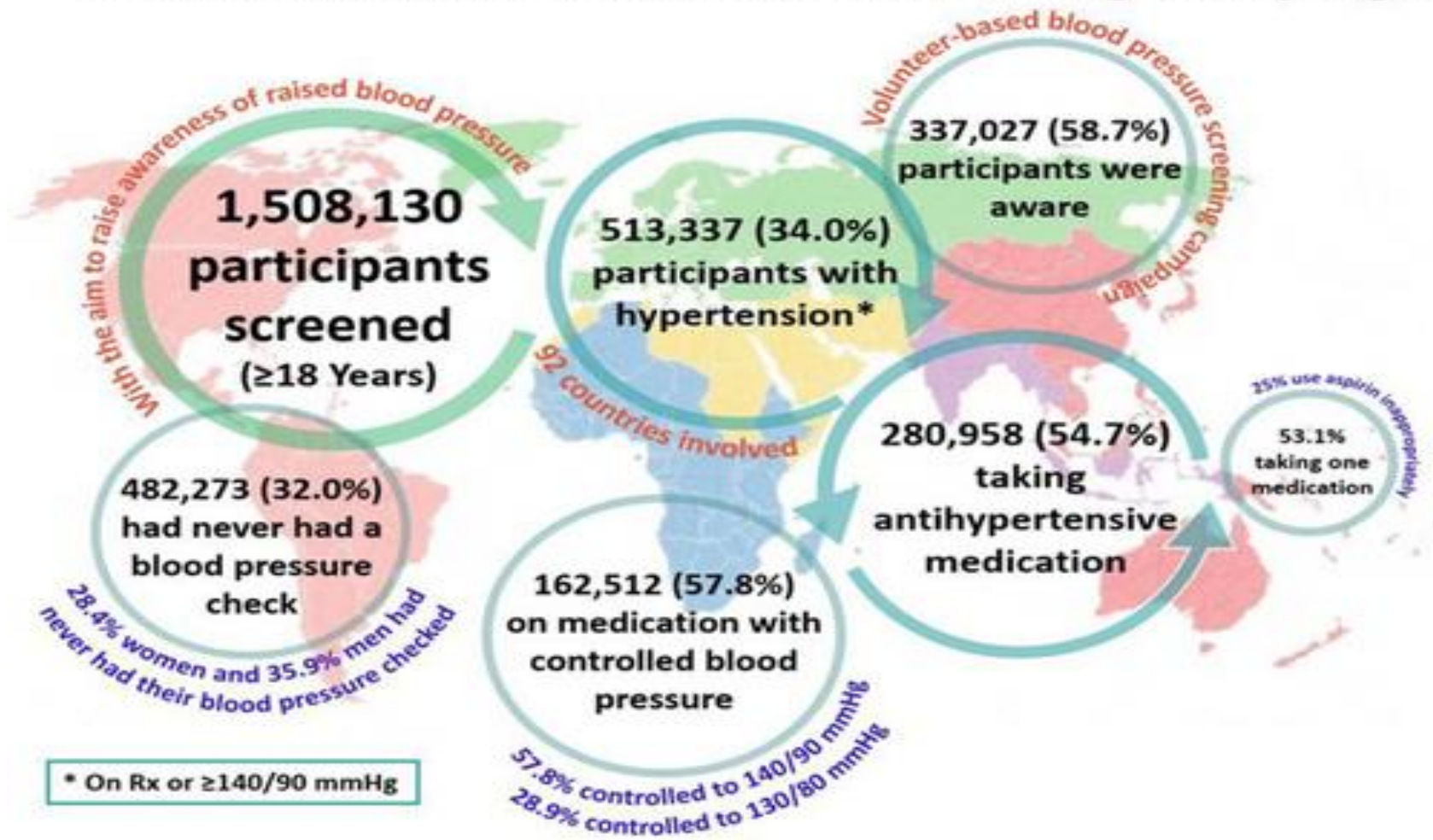
The Global Blood Pressure Screening Campaign of the International Society of Hypertension

See Editorial, pp 318–320

Thomas Beaney , Aletta E. Schutte, George S. Stergiou, Claudio Borghi, Dylan Burger, Fadi Charchar, Suzie Cro, Alejandro Diaz, Albertino Damasceno, Walter Espeche, Arun Pulikkottil Jose, Nadia Khan, Yoshihiro Kokubo, Anuj Maheshwari, Marcos J. Marin, Arun More, Dinesh Neupane, Peter Nilsson, Mansi Patil, Dorairaj Prabhakaran, Agustin Ramirez, Pablo Rodriguez, Markus Schlaich, Ulrike M. Steckelings, Maciej Tomaszewski, Thomas Unger, Richard Wainford, Jiguang Wang, Bryan Williams, Neil R. Poulter, and on behalf of MMM Investigators*

May Measurement Month 2019

The Annual Blood Pressure Screening Campaign



Advantages

- The MMM19 campaign includes contemporary data from **> 1.5 million** adults from **92 countries** that were collated in a synchronized survey following a common protocol.
- Over 350,000 individuals were detected with untreated or inadequately treated HTN & advised on nonpharmacological management & further follow-up.
- Although **systematic screening** is still a distant prospect for many nations in the world, we think that the MMM campaign should continue **annually** to raise awareness at the individual & population level of this treatable condition which currently leads to approximately 28,000 deaths per day.

Editorial

Global Blood Pressure Screening A Wakeup Call

Suzanne Oparil 

See related article, pp 333–341

Despite the availability of effective treatments that both lower blood pressure (BP) and prevent its cardiovascular disease complications, including mortality, hypertension continues to be the leading risk factor for death and disability worldwide. Data from 195 countries reported in the recent

The original World Hypertension Day was a simple awareness campaign with a theme “Know Your Numbers,” that is, get your BP measured. BP readings from all sources, from health fairs to entire health systems, were accepted, and participating institutions were rewarded by receiving recognition as part of

**Global
percent
change in
CVD DALYs
per 100000
persons
between
2000 & 2016**

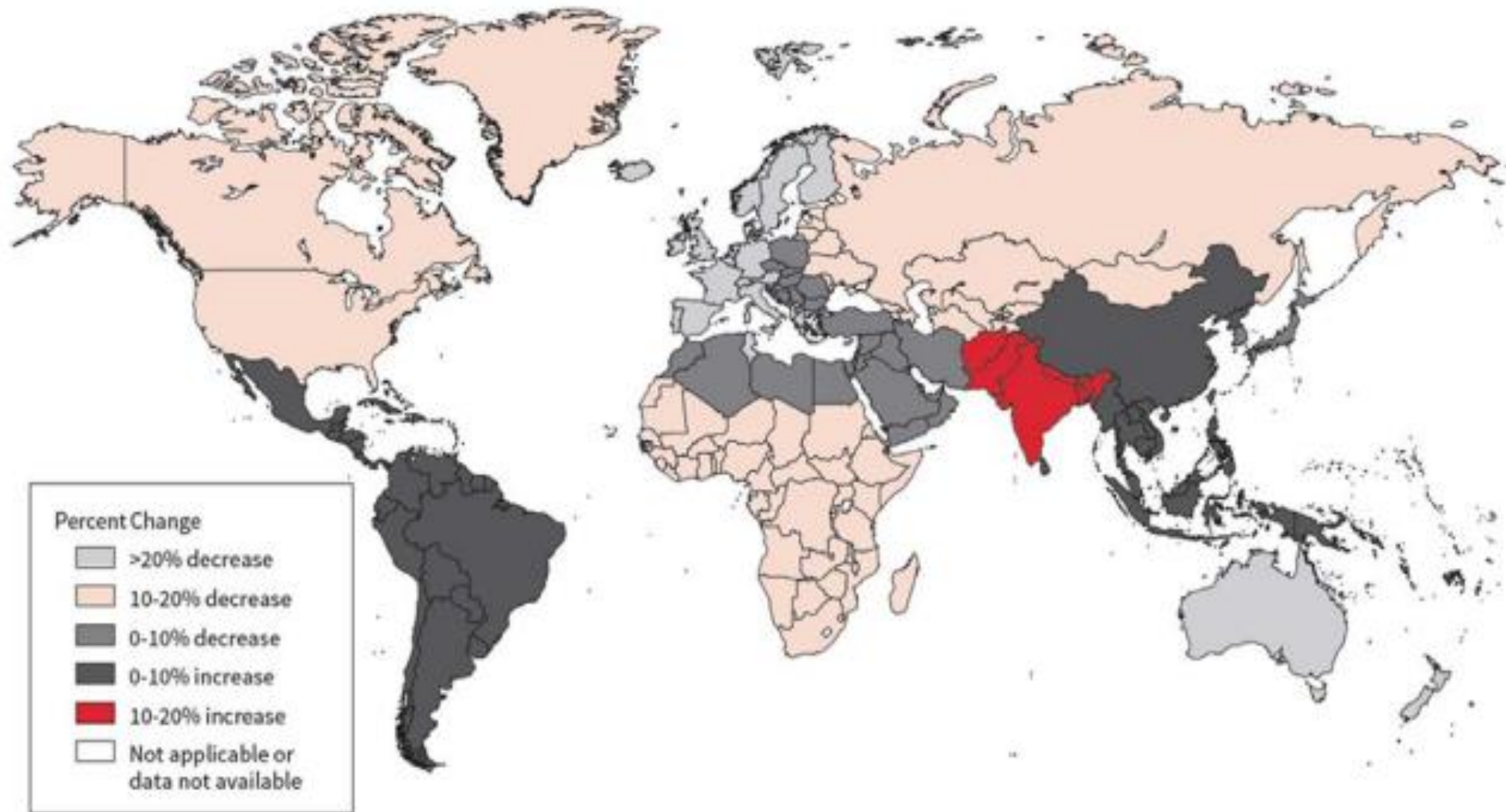


Figure. Change in cardiovascular disease (CVD) disability-adjusted life years (DALYs), 2000–2016, global percent change in CVD DALYs per 100000 person between 2000 and 2016. Adapted from Driving Sustainable Action for Circulatory Health. White Paper on Circulatory Health. Geneva, Switzerland.⁵ Global coalition for Circulatory Health. 2018. World Health Organization: WHO. Geneva, Switzerland.⁶ Health statistics and information systems. Metrics: Disability-adjusted Life Year (DALY). Available from: https://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/.⁷

MMM 2019

- Participation in screening was worldwide:
 - South Asia 31.37%
 - East Asia 18.6%
 - The Americas 17.4%
 - Sub-Saharan Africa 11.8%
 - Southeast Asia & Australasia 8.1%
 - Europe 7.1%
 - Northern Africa & **Middle East** 5.8%

MMM 2019




- MMM 2019 was highly cost effective, estimated at **\$0.65 USD** for each case of untreated or treated but uncontrolled HTN detected.



STUDY PROTOCOL

The Iranian blood pressure measurement campaign, 2019: study protocol and preliminary results

Afshin Ostovar^{1,2}  · Sadaf Sepanlou³ · Mohammad Shariati⁴ · Alireza Mahdavi Hezaveh² · Elham Yousefi² · Alieh Hodjatzadeh² et al. *[full author details at the end of the article]*

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Abstract

Purpose Hypertension is one of the most important risk factors for premature mortality and morbidity in Iran. The objective of the Iranian blood pressure (BP) measurement campaign was to identify individuals with raised blood pressure and providing appropriate care and increase the awareness among the public and policymakers of the importance of tackling hypertension.

Methods The campaign was conducted in two phases. The first (communication) phase started on May 17th (International Hypertension Day). The second phase started on June 8th, 2019, and lasted up to July 7th during which, blood pressures were

The Iranian BP measurement campaign, 2019



- **The campaign was conducted in 2 phases.**
 - I. Communication phase started on May 17th (**IHD**).
 - II. The second phase started on June 8th, 2019, & lasted up to July 7th during which, BPs were measured.
- **The target population was Iranians aged ≥ 30 ys.**

The Iranian BP measurement campaign, 2019



- Participants voluntarily referred to **health houses** in rural & health posts & comprehensive health centers in urban areas in the setting of the Primary Health Care network.
- Additionally, over **13,700 temporary stations** were set up in highly visited places in urban areas.

The Iranian BP measurement campaign, 2019

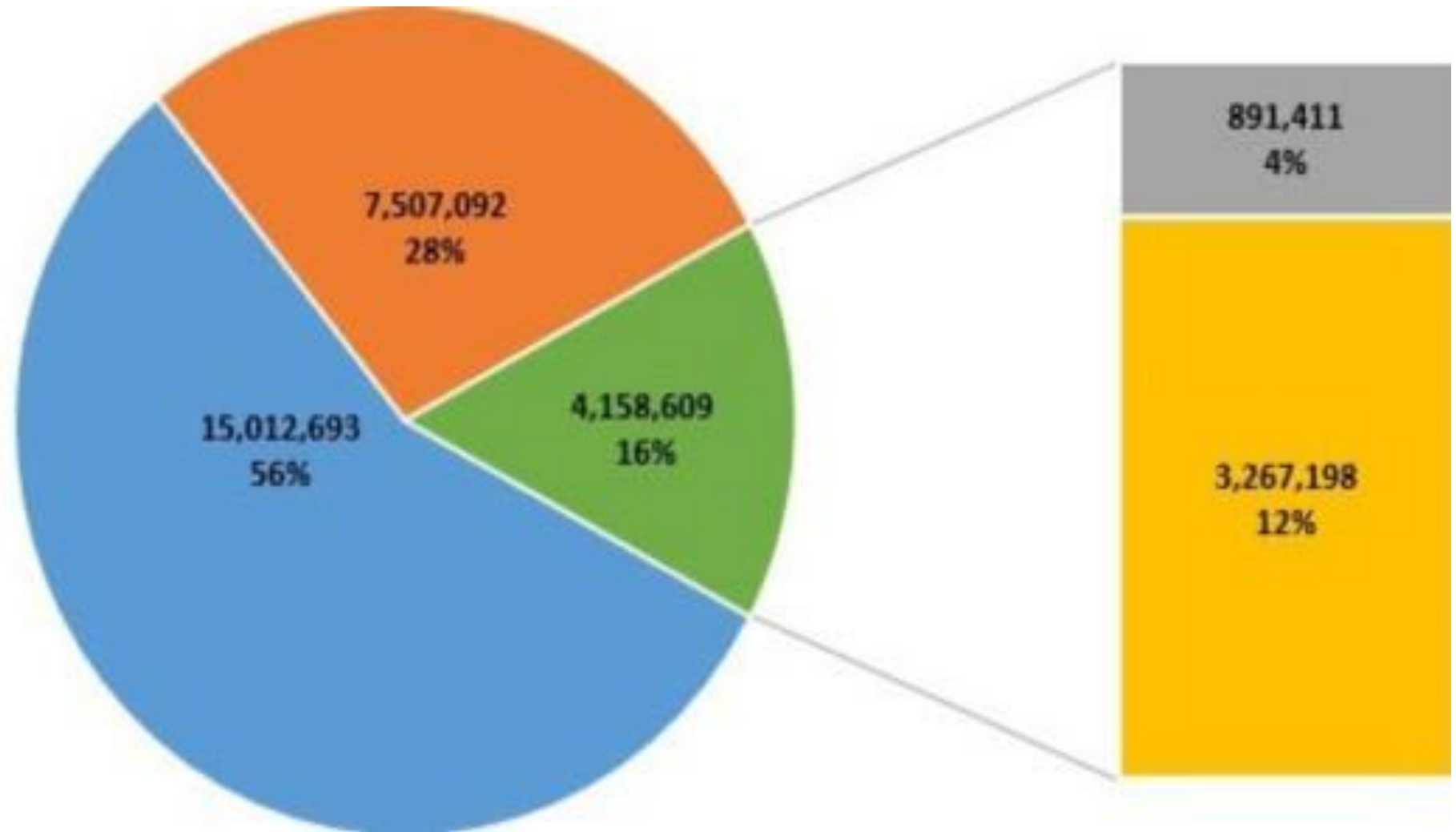


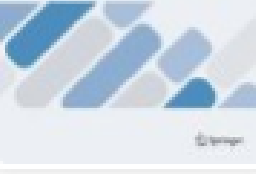
- **BP was measured for a total of 26,678,394 participants.**
- **Female 51.4%**
- **Mean age 46 ± 14.1 ys**

The Iranian BP measurement campaign, 2019



- Normal blood pressure
- Pre-hypertension range
- Raised blood pressure
- Past Hypertension History





Conclusion

- The Iranian BP measurement campaign proves its feasibility in low & middle-income nations.
- As a large number of people are unaware & untreated, urgent action is mandatory.
- Mass screening can be an effective approach if it is conducted on an annual basis.

[Intervention Review]

Screening strategies for hypertension

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Contact address: Tamara Kredo, tamara.kredo@mrc.ac.za.

Editorial group: Cochrane Hypertension Group.

Publication status and date: Edited (no change to conclusions), published in Issue 5, 2020.

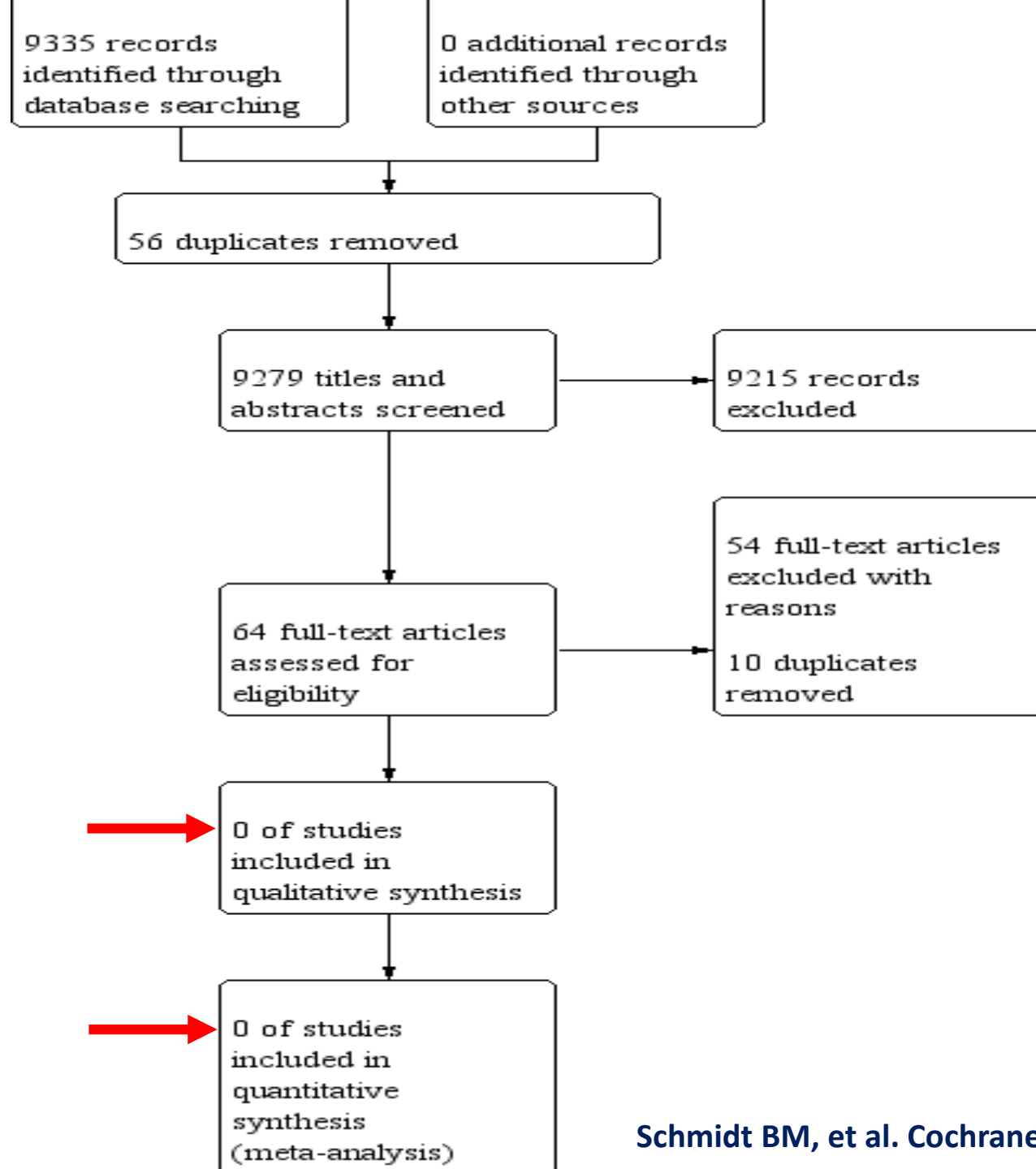
Citation: Schmidt B-M, Durao S, Toews I, Bavuma CM, Hohlfeld A, Nury E, Meerpohl JJ, Kredo T. Screening strategies for hypertension. *Cochrane Database of Systematic Reviews* 2020 Issue 5. Art. No.: CD013212. DOI: [10.1002/14651858.CD013212.pub2](https://doi.org/10.1002/14651858.CD013212.pub2).

Objectives

- **To assess the effectiveness of different screening strategies for HTN:
(mass, targeted, or opportunistic)
to reduce morbidity & mortality associated with HTN.**

Types of interventions

- Studies on mass, targeted, or opportunistic HTN screening compared to **no screening** with participant follow-up of at least **one year** were eligible.
- The Cochrane HTN Information Specialist searched the following databases without language, publication year, or publication status restrictions until 9 April 2020.



R E S U L T S: Description of studies

- **None** of the retrieved studies met the inclusion criteria.
- This **'empty'** review (no studies were included) will follow the guidelines provided by Cochrane on reporting empty reviews & results from excluded studies.

Authors' conclusions:

- There is an implicit **assumption** that early detection of HTN through screening can reduce the burden of morbidity & mortality, but this assumption has not been tested.
- Well-conducted experimental & observational studies are needed to assess the **effectiveness of different screening** strategies for HTN to reduce morbidity & mortality associated with HTN.

Final Recommendation Statement

Hypertension in Adults: Screening

April 27, 2021

US Preventive Services Task Force

Recommendations made by the **USPSTF** are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.







Screening for Hypertension in Adults

US Preventive Services Task Force Reaffirmation Recommendation Statement

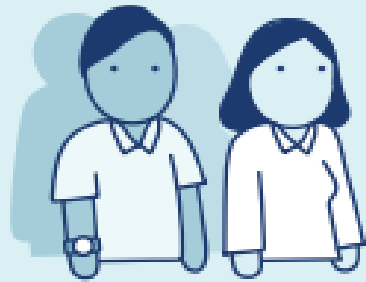
US Preventive Services Task Force

IMPORTANCE Hypertension is a prevalent condition that affects approximately 45% of the adult US population and is the most commonly diagnosed condition at outpatient office visits. Hypertension is a major contributing risk factor for heart failure, myocardial infarction, stroke, and chronic kidney disease.

-  [Editorial page 1618](#)
-  [Multimedia](#)
-  [Related article page 1657 and JAMA Patient Page page 1688](#)
-  [Supplemental content](#)

Screening for Hypertension in Adults

Hypertension, or high blood pressure, is a common and treatable condition in adults that increases the risk of cardiovascular disease, including heart attack and stroke.



Population

Adults aged 18 years or older who do not already have a diagnosis of high blood pressure



USPSTF recommendation

The USPSTF recommends screening for hypertension in adults aged 18 years or older with office blood pressure measurement. The USPSTF recommends obtaining blood pressure measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

Screening for Hypertension in Adults

Hypertension, or high blood pressure, is a common and treatable condition in adults that increases the risk of cardiovascular disease, including heart attack and stroke.

This recommendation does not provide details on different types of screening strategies for HTN



USPSTF recommendation

The USPSTF recommends screening for hypertension in adults aged 18 years or older with office blood pressure measurement. The USPSTF recommends obtaining blood pressure measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

GLOBAL IMPACT OF BLOOD PRESSURE THRESHOLDS



> 4 MILLION blood pressure screenings in > 100 COUNTRIES

≥ 18 year old volunteers



3 successive measurements

changing the threshold for the definition of hypertension
From $\geq 140/90$ to

$\geq 130/80$ $\geq 120/70$

METHODS

Absolute and relative increase in proportion of individuals defined as having hypertension when threshold is moved from $\geq 140/90$ to

$\geq 130/80$ **23% absolutely**
 78% relatively

$\geq 120/70$ **52% absolutely**
 175% relatively

These changes:
Differed between countries and were **MORE PRONOUNCED** in **LOW INCOME** than in **HIGH INCOME** countries

RESULTS



Global changes to the thresholds used for the definition of hypertension have potential **SOCIOECONOMIC CONSEQUENCES** that may pose **SUBSTANTIAL CHALLENGES** for many health care systems world-wide.

CONCLUSIONS

Increase of estimated prevalence of hypertension when applying the threshold of $\geq 130/80$ compared to the criteria of $\geq 140/90$ mmHg (the darker the colour the higher the increase in prevalence of hypertension with change of threshold).

Janis M. Nolde, Thomas Beaney, Revathy Carnagarin, Aletta E. Schutte, Neil R. Poulter, Markus P. Schlaich
Global impact of different blood pressure thresholds in 4,021,690 participants of the May Measurement Month initiative
JOURNAL, YEAR
DOI



Take-home Message

- Based on current evidence (**with high certainty**), the net benefit of screening for high BP in adults is substantial.
- Currently, evidence to support any specific type of screening strategy for HTN is lacking.

Take-home Message

- Pragmatically, on the one hand, governments should be **cautious** in rolling out mass screening programmes that are **costly**, without evidence that screening will lead to treatment-seeking, treatment adherence, & changed lifestyle behaviours.
- On the other hand, governments may **continue** to offer screening to those individuals who are at greater risk than the general population, or to individuals who are already engaging with integrated healthcare services.



WKD 2016 in Isfahan